BALL MOUNTAIN LAKE

JAMAICA AND LONDONDERRY, VERMONT

FOREST MANAGEMENT PLAN

MASTER PLAN APPENDIX B

AND

FISH AND WILDLIFE MANAGEMENT PLAN

MASTER PLAN APPENDIX D

DEPARTMENT OF THE ARMY
NEW ENGLAND DIVISION, CORPS OF ENGINEERS
OPERATIONS DIVISION
WALTHAM, MASSACHUSETTS 02254

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This plan sets forth a maintenance and enhancement program for the forest, fish, and wildlife resources at Ball Mountain Lake. This plan will provide a working outline of management practices to maintain and enhance the forest, fish, and wildlife resources indigenous to the area and allow sustained consumptive and non-consumptive uses of those resources.

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1. The subject appendices, prepared in accordance with ER 1130-2-400, dated May 1971, has been approved by the Division Engineer.

2. The plan has been developed to increase the value of reservoir lands for recreation and wildlife, and to promote natural ecological conditions by following accepted conservation practices.

3. This plan has been developed in coordination with the U.S. Fish and Wildlife Service, the Vermont Agency of Environmental Conservation and should serve as an information copy.

J. C. WONG
Acting Chief, Operations Division

Incl
as

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TO: Division Engineer

FROM: Acting Chief, Operations Division

DATE: 1 June 1982

CMT 1: Mr. Mitchell/lr/305

1. Inclosed for your approval is the Forest and Fish and Wildlife Management Plan for Ball Mountain Lake. This plan will serve as Appendices B and D to the Master Plan for this project.

2. It has been prepared in conjunction with ER 1130-2-400, dated 28 May 1971. It has been reviewed by NED Planning and Real Estate Divisions; and the Vermont Agency of Environmental Conservation, the U.S. Forest Service and the U.S. Fish and Wildlife Service.

3. Division Engineers have been designated as approval authority for these plans by ER 1130-2-400. Information copies are to be forwarded to OCE upon approval.

J. C. Wong

J. C. WONG
Acting Chief, Operations Division

Incl
as

NEDDE

TO Chief, Operations Division FROM Division Engineer DATE 20 July 82 CMT 2

[X] APPROVED [ ] DISAPPROVED

C. E. Edgar III

C. E. EDGAR, III
Colonel, Corps of Engineers
Division Engineer

BALL MOUNTAIN LAKE

JAMAICA AND LONDONDERRY, VERMONT

FOREST MANAGEMENT PLAN

MASTER PLAN APPENDIX B

AND

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DEPARTMENT OF THE ARMY
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WALTHAM, MASSACHUSETTS 02254

MAY 1982

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TABLE OF CONTENTS

TABLE OF CONTENTS (Cont'd)

TABLE OF CONTENTS (Cont'd)

SECTION 1. INTRODUCTION

Purpose

This plan sets forth a maintenance and enhancement program for the forest, fish, and wildlife resources at Ball Mountain Lake. Implementation of this plan will primarily provide for wise usage and minimal waste of the present natural resources and perpetuation of those resources.

Authority

This natural resources management plan complies with the requirements for Master Plan Appendices B (Forest Management Plan) and D (Fish and Wildlife Management Plan) as set forth in ER 1130-2-400, dated 28 May 1971.

Management Objectives

This plan will provide a working outline of management practices to maintain and enhance the forest, fish, and wildlife resources indigenous to the area and allow sustained consumptive and non-consumptive uses of those resources.

Coordination

This plan has been coordinated with the Vermont Agency of Environmental Conservation, the U. S. Forest Service, the U. S. Fish and Wildlife Service, and several private groups concerned with natural resource management on public lands.

SECTION 2. PROJECT DESCRIPTION

Location

Ball Mountain Lake is located on the West River in the townships of Jamaica and Londonderry, Windham County, Vermont. It is located in the southeastern part of the State about 29 miles upstream of the confluence of the West and Connecticut Rivers at Brattleboro, Vermont, and approximately 27 miles north of the Massachusetts-Vermont border. The reservoir is two miles north of Jamaica, Vermont, and 9.5 miles upstream of the Corps' dam at Townshend Lake. Major roads in the area are Vermont State Highways 30 and 100.

Acquisition

Ball Mountain Lake is a unit of the comprehensive plan for flood control in the Connecticut River Basin. Authorization for the project is contained in the Flood Control Act of 1938 (Public Law 761 - 75th Congress, 3rd Session) as modified by the Flood Control Act of 1941 (Public Law 228 - 77th Congress, 2nd Session). Construction of the project began in April, 1956, and was completed in October, 1961.

General

The reservoir area consists of a total of 965 acres of fee-owned land. The permanent pool covers 20 acres, and the summer-season conservation pool covers 75 acres. Land area available for terrestrial management totals about 865 acres with approximately 558 forested acres.

The reservoir is elongated in shape with a length of about 6.5 miles and a maximum width of about 2,000 feet. The permanent pool is maintained to protect the gates from freezing during the winter. This pool has a maximum depth of 25 feet at elevation 830.5 feet NGVD. The elevation of the summer conservation pool is 870.5 feet NGVD and has a maximum depth of 65 feet with an average depth of about 30 feet.

History

Land in the area of the dam was formerly woodland and pasture, while the land in the recreation area was principally farmland. Lumbering and farming were and still are the major industries in the area.

Topography

The general topography of Ball Mountain Lake is hilly with steep, wooded slopes. The reservoir lies on the western edge of the eastern foothills of the Green Mountains.

Climate

The climate of the area is variable and characterized by frequent but generally short periods of heavy precipitation during the summer months and longer periods of less intense precipitation during the winter months. Winters are moderately severe with below $0^{\circ}F$ temperatures being common. Summers are mild with temperatures going over $90^{\circ}F$ only infrequently. Precipitation is fairly well distributed over the whole year. This reservoir lies in the path of "prevailing westerlies" and is exposed to cyclonic storms from the west or the southwest, coastal storms that travel up the Atlantic seaboard (either tropical hurricanes or extra-tropical storms known locally as "northeasters"), and thunderstorms of local origin or of the frontal type. The mean annual snowfall amounts to approximately 87 inches.

There is no flood-free season of the year since the West River watershed responds quickly to periods of heavy rainfall which may occur in any month. The main factor contributing to the rapid runoff in the West River drainage above Ball Mountain Lake is the steepness of the mountain slopes.

Geology and Soils

The reservoir is located in the upland section of New England and is characterized by dissected and glaciated peneplains. The river originally eroded through the relatively thin series of Cretaceous and Comanchean deposits which overlaid the harder rocks of the Fall Line Peneplain. The area soils are glacial in origin and are part of the Gray-Brown Podzolic group. The soils on the more level sites are Shelby and Gloucester loam.

SECTION 3. AREA CLASSIFICATION

Forest Land

Ball Mountain Lake has approximately 558 acres of forested land. The principal cover types are sugar maple-beech-yellow birch (Acer saccharum - Fagus grandifolia - Betula alleghaniensis), white pine - northern red oak - white ash (Pinus strobus - Quercus rubra - Fraxinus americana), white pine, and aspen (Populus spp.).

Open Land

Open lands at this reservoir are associated primarily with the project administration areas, the camping area, old fields, borrow areas, and areas cleared during construction and during a dead tree removal contract.

Open lands in the administration areas and in the camping area are maintained by frequent mowings. Most of the old fields are in various stages of growing into brush.

Recreation Areas

For recreation areas, Ball Mountain Lake has a small picnic area located near the utility building and Winhall Brook Camping Area located at the confluence of the West and Winhall Rivers. The remainder of the reservoir is open to dispersed recreational activities such as hiking, hunting, fishing, and nature photography and observation. During the winter, the reservoir lands are used by snowmobilers, snowshoers, and cross-country skiers.

Aesthetic Areas

Ball Mountain Lake has two overlook areas. The turn-around area at the dam provides an excellent view of the dam and the spillway, the gate-house with Shatterack Mountain as a backdrop, and the lower reservoir area. An overlook area off the access road to the dam provides a good view of the lake with the foothills of the Green Mountains in the distance.

Fish and Wildlife Management Areas

Specific fish and wildlife management areas are the whitetail deer (Odocoileus virginianis) wintering area, the fields along both sides of the West River upstream of the confluence of the West and Winhall Rivers, the rivers upstream of Pratt's Bridge, the summer pool, and tract A-107-2. These areas will be managed to primarily benefit indigenous fish and wildlife species.

SECTION 4. FOREST RESOURCES

Forest Compartments

To facilitate management of Ball Mountain Lake's forest resources, four compartments have been assigned to the 558 acres of forested land. See Exhibit B for the forest compartment map.

Forest Types

Forest cover types were determined using Forest Cover Types of North America, published by the Society of American Foresters.

Sugar maple -- American beech -- yellow birch occupies the greatest number of acres. This cover type exists throughout most of the reservoir.

White pine constitutes the second largest forest cover type and exists as plantations and as natural stands in various size classes. It is this cover type that provides winter habitat for whitetail deer at Ball Mountain Lake.

Three additional forest cover types can be found on government property. They are white pine -- northern red oak -- white ash, aspen, and northern red oak.

Forest Inventory

In 1981, a timber inventory was conducted using a calibrated wedge prism with a basal area factor (BAF) of 10. Sample plots were picked at random using a random numbers table.

Hardwood species sampled were white ash, bigtooth aspen (Populus grandi dentata), quaking aspen (P. tremuloides), American basswood (Tilia americana), American beech, paper birch (Betula papyrifera), sweet birch (Betula lenta), yellow birch, black cherry (Prunus serotina), American elm (Ulmus americana), sugar maple, red maple (Acer rubrum), northern red oak, and American sycamore (Platinus occidentalis). Balsam fir (Abies balsamea), eastern hemlock (Tsuga canadensis), eastern white pine, and red spruce (Picea rubens) comprised the softwood component.

The total estimated volume for the project is 3,633,141 board feet with volumes per acre ranging from 14,191 board feet per acre for white pine to 77 board feet per acre for sweet birch. See Exhibit A for volume table.

Compartment 1 contains all forest cover types found at Ball Mountain Lake. Much of the forested acreage is on steep (greater than 45 percent) slopes with timber quality being poor. The sugar maple -- American beech -yellow birch cover type on the west side of the compartment contains timber of a higher quality (fair to good) on less steep slopes.

Compartment 2 contains three forest cover types. Sugar maple -- American beech -- yellow birch covers the greatest number of acres. White pine has a general height class of 3 (41' to 60'). The white pine cover type is located on gentle slopes allowing much better access than the sugar maple -American beech -- yellow birch cover type. The quality of the pine is fair to good.

Aspen constitutes the third cover type in this compartment. It is located along the river on gravel soils and should be left uncut to provide for soil holding and reduced erosion.

Compartment 3, located on the west side of the river between the campground and Pratt's bridge, is predominantly sugar maple -- American beech -yellow birch. A small (5.8 acres) white pine plantation is also located in this compartment and contains the highest volume/acre (14,191 bd. ft./acre) for the project. The quality of the pine is fair. The plantation is in need of thinning as the basal area is 260 square feet/acre.

Compartment 4, in which Winhall Brook Camping Area is located, contains a white pine stand having a southern aspect. Also, the sugar maple -American beech -- yellow birch cover type is located in this compartment.

Since the camping area is located in this compartment, cutting of trees should be restricted to the removal of trees posing a safety hazard and an improvement cut in the white pine stand.

SECTION 5. AQUATIC WILDLIFE RESOURCES

General

The lifeblood of an aquatic ecosystem is the water itself. It is the medium that provides cover, physical support, temperature regulation, and all the other necessary elements of aquatic life. Therefore, it is essential that the limnological characteristics be available to those who are attempting to manage an aquatic ecosystem. The individuals responsible for the implementation of this management plan must avail themselves of all available data from the NED Water Quality Lab, the State of Vermont, and any other data sources. If necessary, additional field studies should be conducted for the express purpose of implementing this plan.

The management of the aquatic community begins with the recognition of the major indigenous species and some of their habitat requirements. A good management plan gives consideration to all indigenous species whether they are residents, transients, or (in some special cases) incidentals. The interrelationships of all species must be considered before any management practices are implemented.

Warm Water Fishery

For warm water fish in Vermont, the major danger is overpopulation. Most warm water species are prolific spawners, and overpopulation results in stunted growth. Therefore, stocking should be unnecessary, except to create a new warm water fishery. This type of stocking should be tried only after biological data have been collected and analyzed and there is proof that a niche is available for the species selected for stocking.

Prior to 1982, no surveys have been run to check the warm water fishery at Ball Mountain Lake. The presence of smallmouth bass (Micropterus dolomieui) has been reported by various fishermen. The fall drawdown of the pool from 65 feet to 25 feet limits the possibilities for management of a warm water fishery in the pool. Also, the lack of a public boat ramp limits the amount of pressure that a fishery would receive.

Smallmouth Bass

Smallmouth bass prefer cool, flowing streams or large, clear lakes that have only moderate amounts of aquatic vegetation. Spawning areas are along the shore, usually on gravelly or rocky bottoms with some type of shelter (an out-tilted tree or large boulder) nearby. Water levels should be stable in the spring and early summer to reduce the mortality of eggs or fry. Floods, water level recession, predators, and fungus are the main causes of egg or fry loss.

The diet of the fry consists of planktonic crustaceans, with the addition of insects and small fishes when the fry have reached one to two inches in length. The adult smallmouth feeds predominantly on crayfish, fish, and insects.

The most serious competitors to smallmouth bass are largemouth bass (Micropterus salmoides) and bullheads (Ictalurus spp.). Rock bass (Ambloplites rupestris), sunfish (Lepomis spp.), and yellow perch (Perca flavescens) are less serious competitors, and their young are utilized as food by adult smallmouths.

The most serious pest is the bass tapeworm (Proteocephalus ambloplitis) which infects the reproductive organs. This parasite is more common in lakes than in streams.

Cold Water Fishery

Brown (Salmo trutta) and brook (Salvelinus fontinalis) trout are presently found in the river above and below the reservoir impoundment at Ball Mountain Lake. Brown trout are probably present in the reservoir impoundment, too.

Brown Trout

The brown trout is a cold water fish but can tolerate water temperatures over 80°F depending upon the length of time that the water stays at higher temperatures. Spawning usually occurs in the mid to late fall, and brown trout normally spawn in stream gravel. They prefer sites at the tail end of a pool with a good vertical flow of water. Areas shaded by willow growth are also preferred.

Browns are opportunistic feeders and eat a wide variety of aquatic and terrestrial insects, crustaceans, and other invertebrates. Large browns are more piscivorous than smaller brown trout. Brown trout withstand competition from other trout species well.

Brook Trout

Brook trout live in a wide range of habitats and can tolerate water temperatures from 32°F to about 75°F, but they usually do poorly when water temperatures exceed 68°F for extended periods. The optimum water temperature range for maximum activity and feeding is 55°F to 66°F.

Brookies usually inhabit well--aerated waters where the dissolved oxygen approaches the saturation point, although they can adapt to and withstand low oxygen concentrations. The tolerable pH range for wild populations is 4.1 to 9.5.

Freshwater populations do not migrate extensively. Spawning usually occurs from August to January, depending on the latitude and water temperature. Spawning occurs successfully in both lakes and streams. Preferred spawning areas are gravel beaches with upwelling seep water or spring-fed areas in lakes and gravel riffles or the lower end of pools in streams. Slow growth, poor condition, and stunting occur in waters with large numbers of brookies and insufficient food.

Brook trout primarily eat immature and adult aquatic insects, terrestrial insects, and planktonic crustaceans. Larger brookies will occasionally eat fish and crayfish.

The brook trout is a good species to stock in a cold water lake where spawning streams suitable for other trout are lacking. Normally, stream populations are self-sustaining. Small dams in the shallow headwater areas sometimes improve the habitat.

Aquatic Furbearers

Few aquatic furbearer signs have been found at Ball Mountain Lake. No signs of muskrats (Ondatra zibethica) have been noticed, and most of the beaver (Castor canadensis) sign is old. Any beavers present are probably bank--dwellers. Mink (Mustela viseon) are present, but no otters (Lutra canadensis) have been found at this reservoir.

Waterfowl and Shorebirds

Ball Mountain Lake provides little quality waterfowl habitat because of the lack of marshes and fields, the fluctuating water level, and the lack of waterfowl food (terrestrial and aquatic) in the basin. At the present time, waterfowl probably utilize the project as a temporary resting site during migration. The reservoir clearing done by contractual labor during the winter and spring of 1976 will create some open areas along the shoreline of the river and the lake, and these open areas may offer more quality nesting habitat for ground-nesting waterfowl species.

Water Quality

The NED Water Quality Laboratory has been recording data at two inflow stations (one each on the West and Winhall Rivers), one interior station at the confluence of the two rivers, nine pool stations, and one outflow station since 1971. Parameters include air and water temperature, conductivity, dissolved oxygen, pH, and turbidity plus numerous metals and elements.

A complete printout of actual data is available from the NED Water Quality Laboratory. Detailed water quality data should be consulted before making any extensive changes in habitat or species management programs.

Reservoir Clearing

Clearing for the present conservation pool was conducted in 1967. In 1976, a clearing contract was awarded to remove trees that were killed by inundation (mainly by the floods of 1969 and 1973). Cleared areas run along the shore of the present conservation pool and thence along the banks of the river to approximately one-half mile upstream of the 65-foot summer pool. The 1976 clearing created open areas needed along the shore of the pool. However, the loss of trees along the river banks allows more sunlight and warmth to reach the river, which may raise the water temperature above the limit for suitable trout habitat.

Future clearings, if necessary, will be conducted with the goal of minimizing any adverse impacts on the projects resources.

Aquatic Vegetation

No aquatic vegetative surveys have been made at Ball Mountain Lake. The fluctuation from the 65-foot summer pool to the 25-foot winter pool precludes the establishment of vegetation in the shallow areas of the summer pool. Establishment of some shoreline vegetation might prove beneficial to the lake fishery and habitats for aquatic furbearers and waterfowl, but stabilization of the pool is necesssary to allow aquatic vegetation to survive.

Commercial Fishing

Presently, no commercial fishing exists at Ball Mountain Lake. The potential for a commercial fishery is poor due to the small area, the annual draw down for the winter pool, and the lack of sufficient populations of commercial species. This reservoir may become more important as a site for sport fishing recreation. Unless the present situation is greatly modified, the reservoir will be reserved for sport fishing only.

Water Level Fluctuation

Water level fluctuations can be detrimental to the aquatic environment with the extent of damage depending upon many factors - such as, the time of year, the amount of fluctuation, and the direction of fluctuation (a raising or a lowering).

Pool fluctuations can also be beneficial if controlled. They can be used to flood an area for the spawning of desired fish or to supply a feeding or nesting area for waterfowl. The water level can also be dropped to destroy the spawning of undesired species.

Ball Mountain Lake is controlled by three 5'8" x 10'0" hydraulic slide gates. The pool is maintained at 65 feet during the summer and at 25 feet during the winter. This twice-yearly fluctuation is detrimental to the warm water fishery. The water level is raised in the spring

allowing the warm water species to spawn and have a high survival of fry. In the fall, the water level is dropped, and many fish (both fall fingerlings and adults) are flushed down river where they compete with the river-run species or die. The stabilization of the pool, other than during a flood, should have a high priority so that a fishery can be established with smallmouth bass and brown trout as the major game fish.

Pool level fluctuations are unavoidable at most man-made structures and, particularly at a flood-control dam. Exact figures on pool fluctuations for Ball Mountain Lake area are available at the project office. These data should be consulted when considering management practices which could be affected by water level fluctuations.

Presently, Ball Mountain Lake is being studied for potential hydroelectric production.

Habitat Maintenance and Enhancement

No aquatic habitat management programs have been implemented at Ball Mountain Lake up to 1982.

Creel Census, Bag Check, and Trapping Report

These three surveys sample the consumptive pressure on the fishery resource, the waterfowl and shorebird resource, and the aquatic furbearer resource, respectively. All three surveys can provide data on population balance and dynamics and establish a basis for the formulation of and the evaluation of future management programs.

Only two creel census forms have been turned in up to 1982. Data from these two forms are summarized in Table 2 (see Exhibit A).

Bag check surveys have not been conducted at this reservoir up to 1982.

Trapping reports were required of each trapping permittee beginning with the 1980--81 trapping season. Data for the 1980--81 season are summarized in Table 3 (see Exhibit A).

Sport Fishing, Hunting, and Trapping

Presently, the fishery at Ball Mountain Lake is limited due to the annual pool drawdown and the apparent lack of pools and cover in the rivers. The fishery is probably adequately utilized by campers and other fishermen. The State of Vermont stocks the rivers with trout (see Table 4, Exhibit A).

Access to the rivers and the upper end of the pool is possible on foot from various gravel roads located on Corps land. Any boats used in the pool must be carried from a roadside parking site as no public boat ramp exists.

Hunting of migratory waterfowl is extremely limited due to the lack of suitable waterfowl habitat. Trapping pressure has been minimal as only five trapping permits were issued from the 1974-75 season through the 1981-82 season. Three of those permits are issued for the 1980-81 season. Beginning with the 1982-83 season, Ball Mountain Lake will be divided into three trapping zones (see Exhibit B). Only one permit will be issued per season for each zone, and permits will be issued through a lottery system.

SECTION 6. TERRESTRIAL WILDLIFE RESOURCES

General

Management of the terrestrial wildlife resources begins with the recognition of the indigenous species to be managed for and their habitat requirements. In general, management practices are beneficial to many wildlife species. Before the implementation of any management techniques, consideration will be given to the effects of the techniques upon other indigenous wildlife species.

Major Species

The main terrestrial wildlife species to be managed for are the following:

Common Name	Scientific Name
Gray Squirrel	*Sciurus carolinensis*
Raccoon	*Procyon lotor*
Red Squirrel	*Tamiasciurus hudsonicus*
Ruffed Grouse	*Bonasa umbellus*
Snowshoe Hare	*Lepus americanus*
Whitetail Deer	*Odocoileus virginianus*
Woodcock	*Philohela minor*

Gray Squirrel

Gray squirrels reach their greatest abundance in extensive stands of nearly mature mixed hardwoods. This species prefers cavities in living trees nearing maturity for permanent-type quarters, while leaf nests serve mainly as temporary summer quarters. The gray squirrel depends on mast crops for food, with a diet consisting largely of acorns, beechnuts, hazelnuts, and butternuts when available. A poor mast crop year can find the gray squirrel hard pressed for sufficient food. During the summer, they will feed on raspberries (*Rubus* spp.), maple seeds, and mushrooms. Occasionally, softwood seeds (especially of pine) will be eaten.

Raccoon

Raccoons inhabit the woodland edge where hardwoods are abundant. Hollow trees are the preferred home of this species, although hollow logs, rock dens, and burrows are also used. Den trees are frequently used by generation after generation. Raccoons prefer to live near streams, lakes, or marshes.

In the spring and early summer, the raccoon's diet consists mainly of insects, crayfish, mussels, fish, and frogs. Nuts, fruits, berries, and grains are included as the summer progresses.

Red Squirrel

Red squirrels are found primarily in evergreen forests. Nests are made in hollow trees when available; if not, the squirrels will burrow into the ground under an old stump or log. The red squirrel's home range is approximately two to four acres but can be smaller when food is plentiful and larger when food is scarce.

Red squirrels are not tolerant of each other during mating season. They guard their home ranges jealously. Included in their diet are nuts from trees, fruits and berries from shrubs and herbaceous plants, mushrooms, and occasional insects and insect larvae. They also utilize the seeds of all the pines, spruces (Picea spp.), hemlock, white cedar (Thuja occidentalis), and balsam fir (Abies balsamea). Red squirrels are fond of acorns, butternuts, and the fruits of basswoods (Tilia spp.). Other foods include raspberries, blackberries (Rubus spp.), wintergreen (Gaultheria spp.), and partridge berries (Mitchella repens).

Ruffed Grouse

Hardwood stands of medium density with a variety of available under growth make satisfactory habitat for ruffed grouse. For adult ruffed grouse, quality cover must contain a variety of plant species composition and a high degree of cover type interspersion. Also, most of the hard wood species within the cover types must produce food suitable for grouse.

Good habitat for the winter months consists of patches of conifers scattered through stands of mixed hardwoods and conifers, bordered by second-growth hardwoods. Some overgrown or cut-over land within the stand is desirable. In mature woods, an understory of mixed coniferous and hardwood reproduction is desirable.

Attractive nesting cover usually consists of second-growth woodlands that are bisected by wood roads and bordered by old pastures, young saplings, overgrown fields, or patches of aspen, birch, or alder (Alnus spp.) with some open land vegetation present. Hardwoods are preferred for nesting habitat with no single species being preferred. Early stages of woodland succession with fresh herbaceous growth and some small openings provide optimum brood cover.

Ruffed grouse have a varied diet. During the summer, insects are important and are supplemented by leaves and berries. In the fall, foods consist of clovers (Trifolium spp.), fruits, seeds, berries, nuts, buds, and various leaves. Winter finds the buds of aspen, birch, and witch-hazel (Hamamelis virginiana) as the favorites. Other good winter foods are apple (Pyrus malus) (especially species that do not drop their fruit), highbush blueberry (Vaccinium spp.), hawthorn (Crataegus spp.), cherry (Prunus spp.), and crabapple (Pyrus coronaria). Spring is a transition period when bud diets are augmented by available green leaves.

Snowshoe Hare

The snowshoe hare is an abundant and prolific species. The interspersion of food and cover (shelter and escape) largely determines its abundance. This species has been called cyclic since its populations appear to have rather regular ups and downs over a period of several years. The hare's food habits are quite similar to those of the whitetail deer. Both woody shoots and herbaceous growth are important in season. Bushy areas, conifer thickets, and small open areas are important to the living habits of this species. Good grouse management and good deer management also benefit the snowshoe hare. The hare is an important species since it is a food source for some larger furbearing predators.

Whitetail Deer

Whitetail deer are forest mammals. They are browsers - eating twigs, shrubs, acorns, fungi, and grass and herbs in season. Breeding season starts in November and can run into February. Fawns are dropped in the spring.

Range requirements during the late spring, summer, and most of the fall are not very specific. As winter progresses and snow depths increase, deer are forced to congregate in the better-sheltered portions of their range to find relief through easier traveling. These wintering areas are usually characterized by low snow depths. The critical sinking depth in snow for deer is 18 inches and is more likely to be found under hardwoods and in open areas than under softwoods. For effective shelter, the trees in the yards must be at or approaching a mature stage. Steep south or southwest facing slopes have a minimum snow accumulation and are frequently used as yards.

In Vermont, the winter range for deer equals approximately ten percent of the summer range. Thus, the limiting factor in maintaining deer populations is the perpetuation of critical winter range.

Woodcock

Woodcock use a number of rather well-defined cover types, each containing a few basic essentials. Good woodcock habitat contains predominant vegetation (small trees and shrubs) of less than 30 years of age, approximately 75 percent overstory density and 25 percent ground cover density, and a rather constant supply of preferred woodcock food in the soil beneath or near the coverts.

The most common places meeting these requirements for woodcock are areas of recent cultivation, drained swamplands, and recently burned or cutover sites. Alder is the most important cover type, followed by crabapple and hawthorn thickets. Density and distribution of coverts is important since woodcock prefer using the edge rather than the interior of stands.

An important feature of woodcock coverts is ground cover, and it may serve as an indicator of site quality. Sites with sparse or absent ground cover produce few earthworms or little other woodcock food, while dense ground cover may hinder probing for food.

Although no single habitat component will guarantee woodcock usage, various factors can probably be ranked in the following order of importance: (1) cover type; (2) soil drainage; and (3) food supply. Animal matter constitutes 90 to 94 percent of the woodcock's diet with earthworms as the most important item. Vegetation (mainly seeds) comprise the remaining 6 to 10 percent and is eaten more in the winter than at other times.

Land Management Practices

All species have basic needs which must be filled by their environment or habitat. These include the primary requirements of food, water, and shelter in adequate quantity and quality. Many species also need escape cover to elude predators. Several species have rather specific habitat requirements for breeding and propagation. Some examples are drumming sites for ruffed grouse, suitable den trees for racoons or pileated woodpeckers (Hylatomus pileatus), and floodproof and relatively predator-proof nesting sites for waterfowl. Each particular species must find all of the daily needs within the immediate range of its daily activity patterns. In general, the greater the interspersion of cover types providing the basic needs, the better the area for that species.

Currently, Vermont is 75 percent forested. Many of the indigenous wildlife species depend on openings and the ecotone between forests and fields. With the extensive woodlands, maintaining the fields and forest openings to increase the diversity of habitat types for wildlife is important. Ball Mountain is considered as having a good proportion of necessary habitat for most wildlife species.

Mature conifer stands are essential for wintering whitetail deer. Other forest wildlife species are dependent on various stages of forest succession.

Adequacy of Lands Allocated to Wildlife

A total of 965 acres are designated for wildlife management. This acreage is adequate for the continued presence of the wildlife species indigenous to the reservoir lands.

Habitat Maintenance and Enhancement

In the Winhall Brook Camping Area, various trees and shrubs were planted during 1977 and 1978 at four sites totaling approximately 0.1 acre. These plants were planted to develop songbird habitat. The planting sites have been unmowed since the time of planting.

Six artificial nesting cavities were erected in the Pratt's Bridge area during 1976. Five of these boxes were the site for eastern bluebirds (Sialia sialis) and tree swallows (Iridoprocne bicolor), while the sixth box was the size for house wrens (Troglodytes aedon) and black-capped chicadees (Parus atricapillus). Three of the bluebird boxes were destroyed by ice during a winter-time flood.

Sport Hunting

The principle game species in the Ball Mountain Lake area are whitetail deer and ruffed grouse. Windham County, Vermont, has produced many whitetail deer in recent years, and the area has long been a favorite hunting area with local and non-resident hunters.

SECTION 7. ENDANGERED, THREATENED, AND RARE SPECIES

General

The balance of nature is a complicated and delicate system which is very poorly understood. Flora and fauna are the barometers by which man can gauge the impact of his civilization on nature. Therefore, it is important to monitor the status of a natural community by observing endangered, threatened, and rare species. It is equally important to avoid placing additional stress on these species.

Endangered, threatened, and rare species of flora and fauna in Vermont are listed in Exhibit A (Table 5).

Flora

At present, no plant species list is available for Ball Mountain Lake. The reservoir area may support some endangered species. As funding and personnel become available, an inventory of plant species will be made to insure that any endangered species are identified and mapped.

Fauna

Ball Mountain Lake has been used by osprey (Pandion haliaetus) and bald eagles (Haliaeetus l. leucocephalus) for feeding, but no nest has been found on reservoir lands.

If a rare, threatened, or endangered species is found at Ball Mountain Lake, management techniques will be followed to help ensure the species' continued survival and reproduction.

SECTION 8. ECOLOGICAL RELATIONSHIPS AND IMPACTS

General

Impacts that alter an environment may be natural or man-made. Noticeable natural impacts are usually severe (such as hurricane blowdowns) and can level mature stands of trees or ruin habitat needed by wildlife species for survival. The difference between natural and man-caused impacts is that impacts caused by man can be controlled and can, therefore, be lessened or eliminated.

Soil Erosion

Streambank erosion has occurred at a few sites along the West and Winhall Rivers. Except for repairing an eroded portion of the camping area, eroded streambanks have been allowed to stabilize naturally. This stablization has been slow at many of the eroded sites.

Inundation of Forest Stands

Considerable mortality of tree species has taken place in areas of frequent inundation. The areas of highest mortality covered a band on each side of the reservoir from the confluence of the West and Winhall Rivers to the dam.

Mortality rates are higher when impoundments occur during the growing season. Impoundments at other times of the year are generally not harmful to trees except for mechanical damage caused by ice. The primary causes of mortality are damage to root structures and siltation on leaf parts upsetting normal transpiration and photosynthesis.

Due to mortality from frequent inundation, the cover type adjacent to the pool is changing from forests to open lands or to more flood-tolerant species of tree.

The effect on vegetation of inundation caused by the regulation and impoundment of water at six New England flood control reservoirs during the June-July 1973 flood was assessed using color infrared photography and corrobative ground surveys. The results were published in the U.S. Army Cold Regions Research and Engineering Laboratory's Special Report 220, "Inundation Damage to Vegetation at Selected New England Flood Control Reservoirs," March, 1975.

Natural Resources Management

The implementation of this natural resources management plan will alter some areas of habitat at Ball Mountain Lake. Some fields will be burned, plowed, and planted. An attempt will be made to alter the pool level regime. These changes are intended to benefit the natural

environment. They are based on an overall view of the project resources with the ecological relationships of the different habitat types considered as an overriding factor.

An Environmental Assessment of the Operation and Maintenance of Ball Mountain Lake was published in December, 1974.

Fire

Forest fires can destroy recreational facilities, wildlife habitat, and the forest ecotone. A sound resource management program must include a fire protection plan to help conserve the natural resources. Details of this plan can be found in Appendix C (Fire Protection Plan) of the master plan.

A solution for fuel management includes prescribed burning which reduces the number, size, and intensity of wildfires. By modifying the understory fuels, prescribed burning improves the site and seedbed conditions for regeneration. Burning can enhance the wildlife habitat, improve the yield and quality of forage, modify the vegetative species composition, and control insects and diseases.

SECTION 9. OUTGRANTS

Outgrants at Ball Mountain Lake include two licenses, two easements, and one lease. Licenses have been granted to the Central Vermont Public Service Corporation (CVPS). Easements have been granted to CVPS and the town of Londonderry.

The only lease has been granted to a private party for approximately seven acres of tract B-213. This lease is for the purpose of growing and harvesting hay only.

The Corps leases approximately four acres of land on Town Road 46 in South Londonderry from a private party. This is the site of the ranger contact station, gate, and turnaround for Winhall Brook Camping Area.

With the exception of concessions, no additional outgrants will be granted at this reservoir.

SECTION 10. DISEASES, POLLUTION, AND OTHER ADVERSE EFFECTS

Wildlife Diseases

Although no evidence of wildlife disease is apparent, this does not preclude the presence of a disease. If an animal is observed displaying unusual behavior, the local game warden should be contacted. All natural wildlife mortality found on reservoir lands will be inspected in an attempt to determine probable cause of death and possible presence of any diseases.

Tree Diseases

American beech (Fagus grandifolia) and American elm (Ulmus americana) are present at Ball Mountain Lake in small numbers and are the respective hosts for beech bark disease and Dutch elm disease (DED). These two insect-fungi relationships have been identified at Ball Mountain Lake. The recommended practice for controlling beech bark disease is to cut and utilize any infected tree.

The recommended practice for DED is to cut and burn infected or dead elms. However, if the elm shows less than 5% flagging and if aesthetically justified, an attempt will be made to combat the disease with injections of benomyl phosphate.

Where possible, diseased trees will be removed by project personnel, through a fuelwood program, or by a commercial contractor.

White pine blister rust (Cronartium ribicola) is present but does not appear to be causing extensive mortality. The white pine stands will be checked for increased infestations of this disease.

Black knot of cherry is also present. This stem disease is caused by the fungus Apiosporina morbosa.

Insects

White pine weevils (Pissodes strobi) have attacked white pines throughout the reservoir area. Damage is evident by the multiple stem pines seen in the area. Artificial control of the white pine weevil is uneconomical, but natural control may be achieved through selective cutting practices to maintain or establish mixed stands of white pine and native hardwoods.

Gypsy moths (Porthetria dispar) infest various portions of Ball Mountain Lake. Although control of gypsy moth numbers on forest lands is expensive and may not be justified in certain areas, control should be attempted where feasible when outbreaks occur. Control methods will include applications of Bacillus thuringiensis.

Tent caterpillars (Malacosoma spp.), fall webworms (Hyphantria cunea), maple leaf cutters (Paraclemensia acerifoliella), and eastern spruce gall adelgid (Adelges abietis) have been identified but are not posing any problem as of 1981.

Air Pollution

Although no large industrial centers exist in the Ball Mountain Lake area, the effects of industrial emissions from other regions of the country are carried with the prevailing winds to be released with rain and snow as nitric and sulfuric acids. The resultant acidification of surface water has rendered some lacustrine systems lifeless in New York State and in Canada.

Water quality data collected from 1971 to 1980 by the NED Water Quality Laboratory show pH levels ranging from 4.6 to 9.3 for the tributaries to the lake. A two year study of acid precipitation will occur throughout New England Division in FY 82 and FY 83. Results will be used to direct and or modify the aquatic biology program.

Pesticides

Pesticide use has been confined to the application of herbicides to the rock slopes of the dam. The herbicides are applied during the growing season to discourage plant growth on the rock slopes. The herbicides used primarily are Banvel, Simazine, Trimec, and 2, 4-D. Use has been confined to the registered application rates. Not all types were used each year.

SECTION 11. MANAGEMENT PROGRAMS

Forestry

General

Management techniques implemented on forested land will, to various extents, affect all the major terrestrial wildlife species listed in Section 6. Many non-listed species will also be affected.

Short-Range Programs (up to 1987)

Forest technicians will conduct a resource mapping during the summer of 1982. Data from this mapdown will be used to set up harvest cuts and timber stand improvement work through 1987.

The white pine plantation in compartment 3 has a basal area of 260 square feet per acre. This plantation will be thinned in two operations with the initial thinning being accomplished by the end of 1986. The initial thinning will lower the basal area to approximately 180 square feet per acre.

In compartment 4, the park rangers will inspect trees in Winhall Brook Camping Area during the spring of 1982. All trees designated as hazardous will be cut by project personnel. During each following year, a survey will be conducted to determine if any trees have become a hazard.

The hardwood stands in compartment 3 will be selectively thinned to enhance wildlife habitat. Only a portion of the compartment will be cut in each year.

Long-Range Programs

Maintenance of the whitetail deer wintering area (see Exhibit B) is a program of high priority. Any timber harvest in the wintering area will be marked to ensure that a checkerboard pattern of dense clumps of evergreens with basal areas exceeding 100 square feet per acre are interspersed with very small openings containing browse. Any harvest plans will be coordinated with the Vermont Department of Fish and Game.

Fish and Wildlife Management

General

Habitat requirements critical to species survival will be identified and managed. Emphasis will be placed on habitat enhancement techniques that focus on the limiting habitat condition. Habitat enhancement techniques beneficial to the wildlife community will also benefit the public by providing additional recreational opportunities for wildlife-human contacts.

Short-Range Programs (up to 1987)

Partially as a result of past reservoir clearing operations, a lack of suitable nesting cavities exists in many parts of the reservoir. From 1982 through 1986 at least 15 artificial nesting cavities will be installed at various locations throughout the reservoir. These boxes will be built to benefit a number of species and will be sized accordingly. Species that will benefit from these cavities include eastern bluebirds, tree swallows, gray squirrels, house wrens, blackcapped chickadees, wood ducks (Aix sponsa), American mergansers (Mergus merganser americanus), and kestrels (Falco sparverius). Also, den trees will be saved whenever possible.

From 1982 through 1986, various shrub and tree seedlings will be planted in the numerous hedges and clumps in the Winhall Brook Camping Area. Tree and shrub species will be chosen on the basis of their usefulness to songbirds for food and cover (nesting and escape). The number of seedlings planted will depend upon availability of suitable stock and funding.

At the present time, the lack of a public boat ramp limits the use of the lake. A one-lane gravel boat ramp and a parking area for 6-8 cars should be constructed at the upper end of the summer pool on the east shore immediately down river of Pratt's bridge. The road from Winhall Brook Camping Area to Pratt's bridge will be improved through the addition of pull-out areas, drainage, and gravel surfacing. Barriers will be utilized to minimize off-road vehicular activity in the boat ramp area. A horse power limit on boat motors will be used to minimize shoreline erosion.

Eroded areas will be located and seeded with a conservation mixture. Mulch will be applied as deemed necessary. The borrow area on the east side of the access road to the dam will be seeded in 1982.

A resource mapping will be conducted during the summer of 1982. Data will be used to further plan natural resource management.

Long-Range Programs

All forest openings and old fields will be maintained in an early successional stage. These open lands will be monitored by the basin park rangers, and the rangers will recommend brushing-out, burning, or mowing at specific times. The extent of the work will be specified before implementation. Generally, old fields will not be reforested, although clumps or hedges of trees and shrubs may be planted to enhance food and cover availability of an area.

When timber cuts are made, some slash may be piled on and around stumps to provide cover for small mammals. Piling of slash will be determined by the pool stage at which the area will become inundated, proximity to the river, fire hazard, and the need for small mammal cover.

Prescribed burns will be used to improve wildlife habitat, to improve the yield and quality of forage, to modify vegetative species composition, to reduce wildfire hazards, to expose mineral soil for seedbeds, and to control insects and diseases. Prescribed burns will be set up and conducted by the basin park rangers in cooperation with the project manager and Operations Division personnel.

To enhance whitetail deer habitat, deer wintering areas on government land will be maintained. Browse species will be favored during any regeneration management in a deer wintering area. See Exhibit B for the location of the whitetail deer wintering area as mapped by the Vermont Department of Fish and Game. More specific mapping will be accomplished when proper conditions exist.

Alder stands suitable for woodcock will be maintained and managed specifically for the "timberdoodles."

Apple trees will be located and mapped. Pruning and releasing will be accomplished as needed.

Investigations will be made into the feasibility of small subimpoundments on or near small streams located on the reservoir lands to be used by waterfowl and aquatic furbearers.

Basin and project personnel will cooperate with applicable State and Federal agencies in surveys of fish and wildlife species, habitats, management protection requirements, and reintroduction efforts.

SECTION 12. RESEARCH AND RELATED ACTIVITIES

The following research and related activities are recommended to enhance the natural resources management program:

a. implement creel census surveys to sample fishing pressure;

b. investigate alternative methods of vegetation control, and implement such methods to reduce the use of pesticides;

c. compile species lists for mammals, birds, reptiles, and amphibians using the reservoir area and for woody and herbaceous flora located on reservoir lands;

d. assess personnel training needs concerning management of the natural resources.

SECTION 13. INFORMATION AND EDUCATION

An information and education (I&E) program is an important aspect of natural resources management. In conjunction with this plan, an I&E program should educate the public about natural resources management and inform them about present and proposed management implementation. The I&E program should be a continual and active program.

Current I&E programs concerning natural resources management involve presentations to school classes, organized groups, and Winhall Brook Camping Area campers by the park rangers and technicians. These presentations are designed to inform and involve the public in natural resources management practices.

The only foreseeable change will be to expand the present I&E program. Areas of expansion could include the establishment of natural resources management demonstration areas and tours, news releases and radio appearances concerning natural resources management programs, and the preparation and distribution of informational materials.

The image and understanding of the Corps' natural resources management program will be enhanced by public contacts initiated through an organized and active I&E program. Information about ongoing interpretive programs and guidelines can be found in the Interpretive Management Plan for the Upper Connecticut River Basin.

SECTION 14. LAW ENFORCEMENT

On Corps of Engineers' flood-control reservoirs, the Federal government retains proprietary jurisdiction. All State and local laws are applicable. All harvesting of fish and wildlife species at Ball Mountain Lake must be carried out in accordance with State fish and game laws and regulations. Corps' personnnel are not responsible for directly enforcing the state laws but will cooperate with State and Federal law enforcement agencies.

Title 36 will be strictly enforced by Corps' personnel, as many sections deal with the protection and management of the natural resources at Corps' reservoirs.

SECTION 15. ANNUAL WORK PLAN

General

The annual work plan will establish a schedule of natural resources management operations. The annual work plan will be developed by 1 March of each year. An assessment of the work accomplished under the previous year's annual work plan will be completed by 1 January. Each annual work plan and assessment will be appended to this plan as part of Exhibit D.

Disposal Plan

Where feasible, merchantable timber will be harvested. For each harvest, a separate plan will be prepared in accordance with ER 405-23-912. Location, area, volume, and justification for each harvest will be included in the disposal plan.

EXHIBIT A. TABLES

TABLE 1

ESTIMATED TIMBER VOLUME BY SPECIES AND COVER TYPE FOR BALL MOUNTAIN LAKE (THOUSAND BOARD FEET -- INTERNATIONAL 1/4-INCH RULE)

Species	Cover Types					Totals
	*16-6	20-2-B	21-3-A	21-P	25-3-A	
White Pine		79.1	637.9	105.0		822.0
Hemlock	37.2				932.3	969.5
Sugar Maple					526.9	526.9
American Beech					121.6	121.6
Sweet Birch					28.4	28.4
Yellow Birch					229.9	229.9
Paper Birch	6.1					6.1
White Ash					409.4	409.4
Black Cherry			7.0			7.0
Red Oak			11.7			11.7
Bigtooth Aspen	5.2		7.0		40.5	52.7
Red Maple					398.2	398.2
Red Spruce					56.7	56.7
TOTALS	48.5	79.1	663.6	105.0	2,736.9	3,633.1

*Unevenaged Aspen

TABLE 2

SUMMARY OF CREEL CENSUS REPORTS AT BALL MOUNTAIN LAKE

Year	Species	Number	% of Total
1980	Brown Trout	3	100

TABLE 3

SUMMARY OF TRAPPING REPORTS FOR BALL MOUNTAIN LAKE

Species	Number Trapped	Season
Beaver	3	1980-81
Mink	1	1980-81
Red Fox	1	1980-81
Raccoon	2	1980-81

TABLE 4

NUMBER OF FISH STOCKED BY STATE OF VERMONT AT BALL MOUNTAIN LAKE

	Species					
		Brown Trout			Rainbow Trout	
Year	1"-3"	6"-7"	8"-9"	10"+	6"-7"	8"-9"
1972	30,000					
1975			2,500			
1976			1,500			1,000
1977		1,500			1,000	
1978			2,500			
1979		2,500				
1980			1,500	1,000		
1981			2,300			

TABLE 5

ENDANGERED, THREATENED, AND RARE SPECIES: STATE AND FEDERAL LISTS FOR VERMONT

Federal List - Fauna

Common Name	Scientific Name
Endangered	
American Peregrine Falcon	Falco peregrinus anatum
Eastern Cougar	Felis concolor cougar
Eastern Timber Wolf	Canis lupus lycaon
Indiana Bat	Myotis sodalis
Southern Bald Eagle	Haliaeetus l. leucocephalus
Threatened	
American Osprey	Pandion haliaetus
Canada Lynx	Lynx canadensis
Fisher	Martes pennanti
Lake Sturgeon	Acipenser fulvescens
Merlin	Falco c. columbarius
Pine Marten	Martes americana
Southeastern Pine Grosbeak	Pinicola enucleator
Special Concern	
Atlantic Salmon	Salmo salar
Black-backed Three-toed Woodpecker	Picoides arcticus
Common Loon	Gavia immer
Common Tern	Sterna h. hirundo
Moose	Alces alces
New England Cottontail	Sylvilagus transitionalis
Northern Three-toed Woodpecker	Picoides tridactylus bacatus
Piping Plover	Charadrius melodus
Red-headed Woodpecker	Melanerpes e. erythrocephalus
Rock (Yellownose) Vole	Microtus chrotorrhinus
Short-billed Marsh Wren	Cistothorus platesis stellaris

State List - Fauna

Common Name	Scientific Name
Endangered	
American Osprey	Pandion haliaetus carolinensis
American Peregrine Falcon	Falco peregrinus anatum
Canada Lynx	Lynx canadensis

Common Name	Scientific Name

State List - Fauna (Cont'd)

Endangered

Eastern Cougar	Felis concolor cougar
Indiana Bat	Myotis sodalis
Lake Sturgeon	Acipenser fulvescens
Pine Marten	Martes americana
Southern Bald Eagle	Haliaeetus l. leucocephalus

State List - Flora

Common Name	Scientific Name

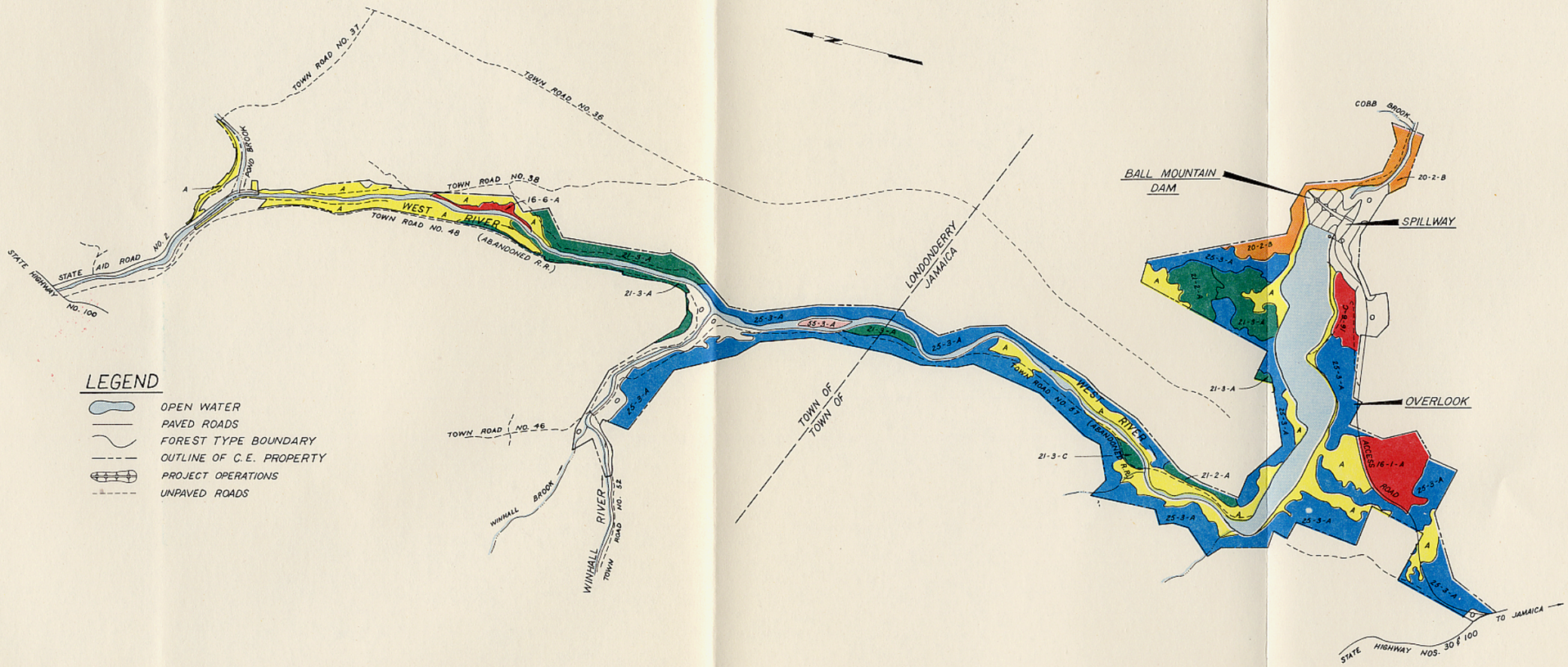
Endangered

Adder's mouth	Malaxis spp.
Green-alder	Alnus crispa
Trailing-arbutus	Epigaea repens
Alpine-mountain ash	Pyrus decora
Mountain-astragalus	Astragalus blakei
Bog-bilberry	Vaccinium uliginosum
Dwarf-bilberry	Vaccinium cespitosum
Butter-wort	Pinquicula vulgaris
Calypson	Calypso spp.
Three-toothed cinquefoil	Potentilla tridentata
Slender cliffbrake	Cryptogramma stelleri
Northern-comandra	Gedcaulon lividum
Coral-root	Corallorhiza spp.
Cow-berry	Vaccinium vitisidaea
Few-flowered cranberry tree	Viburnum edule
Black-crowberry	Empetrum nigrum
Lapland diapensia	Diapensia lapponica
Braun's holly fern	Polystichum brunii
Fragant fern	Dryopteris frangrans, Schoot var. remostinuscula
Northern-gentiana	Amarella spp.
Hoary or twisted-whitlow grass	Draba incana
Alpine-goldenrod	Solidago calcicola
Hedysarum	Hedysarum alpinum, L. var. americanum
Bastard-helleborine	Epipactis spp.
Ladies' tresses	Spiranthes spp.
Chatelain lady's slipper; mocassin flower	Cypripedium spp.
Great-laurel	Rhododendron maximum
Club-moss	Lycopodium selago
Orchid	Orchis spp.
Cranefly-orchid	Tipularia spp.
Rein orchied; fringed orchid	Habernaria spp.
Pale painted-cup	Castilleja septentrionalis

Common Name	Scientific Name
State List - Flora (Cont'd)	
	Endangered
Jack-pine, or gray pine	Pinus banksiana
Grass-pink	Calopogon spp.
Wild-pink	Arethusa spp.
Pinxter-flower	Rhododendron nudiflorum
Rattlesnake-plantain	Goodyera spp.
Pogonia	Pogonia spp.
Three-lobed pogonia	Triphora spp.
Verticillate-pogonia	Isotria spp.
Dwarf canadian-primarose or Pale magenta-pink	Primula mistassinica
Putty-root	Apelctrum spp.
Greeland-sandwort	Arenaria greelandica
Vernal-sandwort	Arenaria rubella
Alpine-saxifrage	Saxifraga aizoon
Mountain-sacifrage	Saxifraga oppositifolia
Spleenwort	Asplenium crypolepsis
Green-spleenwort	Asplenium viride
Twayblade	Liparis spp.
Lister's twayblade	Listera spp.
Alpine-willow	Salix planifolia
Alpine-willow	Salix uva-ursi
Lesser-wintergreen	Pyrola minor
Alpine-woodsia	Woodsia alpina
Smooth-woodsia	Woodsia glabella
Yellow-mountain saxifrage	Saxifraga aizoides
Mountain shadbush	Amelanchier bartramiana

EXHIBIT B. MAPS

Map	Title
1	Forest Compartments and Cover Types
2	Wildlife Management



LEGEND

- OPEN WATER
- PAVED ROADS
- FOREST TYPE BOUNDARY
- OUTLINE OF C.E. PROPERTY
- PROJECT OPERATIONS
- UNPAVED ROADS

S.A.F. COVER TYPES AND LAND CLASSIFICATIONS

- A — ABANDONED FIELD
- O — OPEN/LAWN
- 16 — ASPEN
- 20 — WHITE PINE - RED OAK - WHITE ASH
- 21 — WHITE PINE
- 25 — SUGAR MAPLE - BEECH - YELLOW BIRCH
- 55 — NORTHERN RED OAK

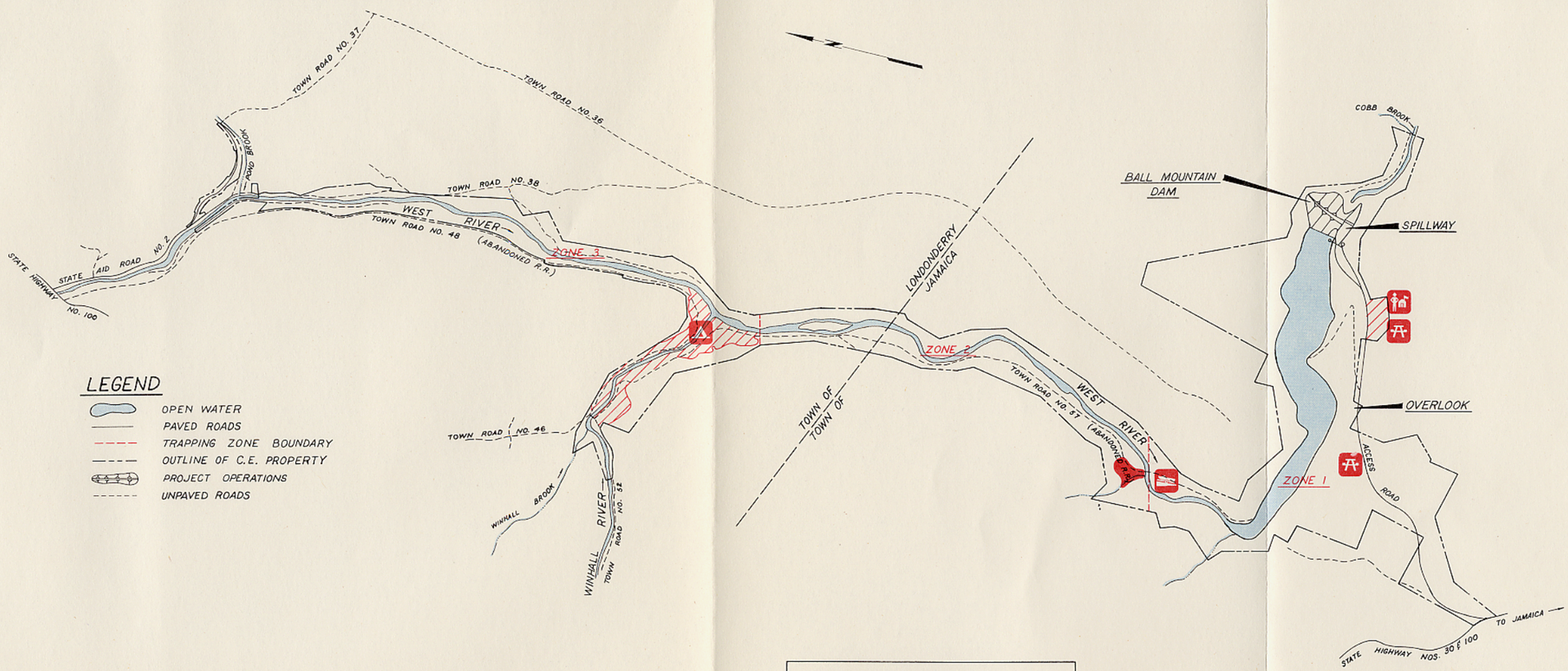
EXAMPLE: 21 - 3 - A

- 21 — S.A.F. COVER TYPE
- 3 — HEIGHT
  - 1 — 0'-20'
  - 2 — 21'-40'
  - 3 — 41'-60'
  - 4 — 61'-80'
  - 5 — 81'-100'
  - 6 — MIXED
- A — STOCKING (% CROWN CLOSURE)
  - A — 81-100
  - B — 61-80
  - C — 41-60

FOREST COMPARTMENTS AND COVER TYPES OF BALL MOUNTAIN LAKE

950 0 950 1900 2850

EXHIBIT B



LEGEND

- OPEN WATER
- PAVED ROADS
- TRAPPING ZONE BOUNDARY
- OUTLINE OF C.E. PROPERTY
- PROJECT OPERATIONS
- UNPAVED ROADS

SYMBOLS

- RECREATION
- TRAPPING ZONES
- SONGBIRD BOXES
- WINHALL BROOK CAMPGROUND
- PROJECT/RANGER'S OFFICE
- PICNIC AREA
- PROPOSED BOAT LAUNCH AREA

WILDLIFE MANAGEMENT-
RECREATION AREAS
BALL MOUNTAIN LAKE

950 0 950 1900 2850

EXHIBIT B

NATURAL RESOURCES MANAGEMENT

BALL MOUNTAIN LAKE

ANNUAL WORK PLAN -- 1981

Thin -- along Pratt's Bridge Road (aesthetics)

Electrofish Survey

Planting -- slope below overlook area